

REMARKS**Pending Claims**

Claims 2, 3, 56, 57, 58, 59, 60, 68, 76, 104, and 105, have been amended to more clearly describe Applicants invention. More specifically, each of these claims has been amended to recite that the hydrophobing agent is a silylating agent. Support for this amendment can be found throughout the present application, and, in particular, page 6, line 10. Claim 78 has been cancelled by this amendment, and, as a result, claims 79, 80, 82, and 88, which depended from claim 78, have been amended to provide proper claim dependency. Claims 91, 93, 94, 98, and 111, which depend either directly or indirectly from amended claim 76, have been amended to provide proper antecedent basis. No new matter has been added. Claims 2-4, 6, 7, 56-59, 62, 63, 67-69, 71, 76, 77, 79-115, and 117-119 are pending.

Summary of the Invention

The present invention relates to organically modified aerogels and lyogels and to processes for preparing them by surface modification of an aqueous gel, without prior solvent exchange.

Information Disclosure Statement

In paragraph 2 of the Office Action, the Examiner states that the Information Disclosure Statement filed January 12, 2004 fails to comply with 37 CFR 1.98(a)(2). More specifically, the Examiner states that copies of the references could not be located in the parent file. Thus, the Information Disclosure Statement has been placed in the file but the information contained therein has not been considered, and the Examiner has crossed out references already of record as redundant.

Enclosed with this Amendment and Response to Office Action is a Supplemental Information Disclosure Statement and Form 1449, which includes copies of the references cited in the Information Disclosure Statement filed January 12, 2004, excluding those crossed out by the Examiner. Applicants believe this Supplemental Information Disclosure Statement complies with 37 CFR 1.98(a)(2) and request consideration of the information contained therein.

Rejection of Claims under 35 U.S.C. § 102

BASF/Ziegler et al

The Examiner has rejected claims 2-4, 56-59, 62-63, 67-69, 71, 76-77, 86, 92, 94, 96-97, 104-106, 109, 115, and 117-119 under 35 U.S.C. § 102(b) as being anticipated by BASF (WO95/06617), as evidenced by Ziegler et al. (U.S. Patent No. 5,738,801). The Examiner points out that BASF is a patent family member of Ziegler et al. and that Ziegler et al. is considered as an English translation of BASF.

In paragraph 4 of the Office Action, the Examiner states that the examples of BASF disclose the formation of a hydrogel and displacement of the water present in the hydrogel with alcohol (also a known hydrophobing agent, which forms estersil groups on the surface of the silica gel), followed by drying to form a hydrophobic aerogel. The Examiner concludes that this process reads on the noted claims. The Examiner also states that BASF/Ziegler et al. teaches pH values within the range of 7.5 to 11 and concludes that this reads on the range 3 to 8.

Applicants respectfully disagree. As amended, the present claims all recite that, in step b), the hydrogel is surface modified with a silylating agent to form a hydrophobic surface modified gel. There is no disclosure of such a silylation in the process described in BASF. Rather, in BASF, an alcohol is used as the hydrophobing agent. The differences between hydrophobic gels produced by processes such as that described in BASF and that of the present

invention are contrasted in detail on page 27, line 23 to page 28, line 24 as well as page 4, line 30 to page 5, line 3 of the present specification.

Therefore, Applicants believe that claims 2-4, 56-59, 62-63, 67-69, 71, 76-77, 86, 92, 94, 96-97, 104-106, 109, 115, and 117-119 are not anticipated by BASF (WO95/06617), as evidenced by Ziegler et al. (U.S. Patent No. 5,738,801), and respectfully request that this rejection be withdrawn.

Hoechst/Schwertfeger et al.

The Examiner has rejected claims 2-4, 6, 56-58, 76-80, 86, 88, 91-92, 94, 97, 99-102, 104-106, 115, and 117-119 under 35 U.S.C. § 102(a) and 102(e) as being anticipated by Hoechst (WO97/03017) as evidenced by Schwertfeger et al (U.S. Patent No. 6,159,539). The Examiner points out that Hoechst is a patent family member of Schwertfeger et al. and is considered as an English translation of Hoechst. The Examiner has also rejected these claims under 35 U.S.C. § 102(f), stating that the Applicants did not invent the claimed subject matter and that Schwertfeger et al. is directed to a different inventive entity.

In paragraph 5 of the Office Action, in discussing Hoechst, the Examiner points to the claims and the examples. In addition, the Examiner cites specific sections relating to the additives and the pH of the initial charge for modification.

Applicants respectfully disagree. The present claims all relate to the surface modification of a hydrogel – i.e., a gel having a liquid phase that contains at least 50% water (see page 6, lines 29-34). This process is not described in Hoechst. Instead, Hoechst teaches the surface modification of a lyogel, which is distinguished from a hydrogel by the plain language of the claims of Hoechst (see step a) of claim 1 of Hoechst which recites “a siliceous lyogel or hydrogel is introduced”).

In more detail, the claims of Hoechst recite a process for preparing organically modified aerogels, in which the lyogel or hydrogel prepared in step a) “is optionally subjected to partial solvent exchange with an organic solvent” (see step b) of claim 1). When read in light of the specification, Applicants believe that the term “optionally” in step b) of the claims of Hoechst

refers to whether a lyogel or a hydrogel is introduced. If a lyogel is used, solvent exchange may not be needed depending on what liquid is contained in the lyogel. However, for the silylation of a hydrogel, Hoechst only discloses a solvent exchange. Thus, Hoechst discloses the silylation of a lyogel or the silylation of a lyogel prepared from a hydrogel by solvent exchange, and does not disclose the silylation of a hydrogel.

For example, Hoechst shows a variety of different solvents that can be used in step b) (see column 4, lines 13-19). In describing step c), the silylation step, Hoechst states that the “solvent- containing gel” is reacted with a specified type of chlorine-free silylating agent (see column 4, line 20). A solvent-containing gel is a lyogel, not a hydrogel, as the term is used in Hoechst. Thus, Hoechst does not disclose, teach or suggest that a hydrogel is reacted with the chlorine-free silylating agents but rather a solvent-containing gel is (i.e., a lyogel).

In addition, in discussing a specific chlorine-free silylating agent, N,O-bis(trimethylsilyl)acetamide, Hoechst states that this reagent is a reactive silylation agent in the presence of water, which permits at least a portion of the complex and cost-intensive solvent exchange before silylation to be dispensed with (see column 4, lines 64-67). Therefore, the reaction can be carried out in aqueous or completely or partially anhydrous organic solvents (see column 4, lines 43-47). This is exemplified by Examples 1 and 2. In Example 1, the hydrogel that is produced is “extracted with acetone until the water content in the gel is below 1% by weight”, and the “acetone-containing gel is then silylated (see column 5, lines 59-63). In Example 2, the hydrogel that is produced “is extracted with acetone until the water content in the gel is 25% by weight”, and the “acetone-containing gel is then silylated” (see column 6, lines 10-13). Thus, comparing Example 2 to Example 1, a portion of the solvent exchange can be dispensed with, but not all of it. Hoechst shows that a lyogel (in particular, an acetone-containing gel), and not a hydrogel, is silylated.

Applicants therefore believe that, based on the plain language of the claims of Hoechst, which recites that a siliceous lyogel or hydrogel is introduced in step a) and this gel is optionally subjected to complete or partial solvent exchange, the recited option refers to which starting gel is used. Hoechst does not disclose the option of silylating a hydrogel, but rather

discloses solvent exchanging a hydrogel to form a lyogel, which is then silylated. This is not the process of the present claims.

Therefore, Applicants believe that claims 2-4, 6, 56-58, 76-80, 86, 88, 91-92, 94, 97, 99-102, 104-106, 115, and 117-119 are not anticipated by Hoechst (WO97/03017) as evidenced by Schwertfeger et al (U.S. Patent No. 6,159,539), and respectfully request the rejections under 35 U.S.C. § 102(a) and 102(e) be withdrawn.

Regarding the rejection of the claims under 35 U.S.C. § 102(f), for the reasons discussed above, Applicants believe that the invention disclosed in the cited reference is not the same as the claimed subject matter and therefore respectfully request that this rejection also be withdrawn.

Rejection of Claims under 35 U.S.C. § 103(a)

The Examiner has rejected claims 87 and 108 under 35 U.S.C. § 103(a) as being unpatentable over BASF (WO95/06617), as evidenced by Ziegler et al. (U.S. Patent No. 5,738,801).

In paragraph 10 of the Office Action, the Examiner states that BASF (as evidenced by Ziegler et al.) discloses, in the examples, forming hydrogels, hydrophobing, and drying. The Examiner notes that BASF/Ziegler et al. differ from claims 87 and 108 in the use of a semi-continuous neutralization process and in the specific mineral acid employed.

Regarding the neutralization process, the Examiner states that modification to a semi-continuous process operation amounts to allowing for equilibrium and/or reaction of the materials prior to continuing the operations. The Examiner concludes that this modification is well within the ordinary skill level of the ordinary skilled artisan at the time of the applicants' invention as would be apparent to those skilled in the chemical manufacturing arts.

Regarding the mineral acid, the Examiner states that BASF/Ziegler et al. teaches neutralization with mineral acid. The Examiner concludes that, while HCl is not specifically mentioned, it is one of the more commonly known mineral acids and would have been obvious to those having ordinary skill in the art at the time of applicants' invention.

Applicants respectfully disagree. Claims 87 and 108 depend directly or indirectly from claim 76 and recite further embodiments of the subject matter of this claim. As amended, claim 76 recites a process for preparing an organically modified aerogel comprising the step of modifying the surface of a hydrogel by mixing with a silylating agent to form a hydrophobic surface modified gel. As discussed in more detail above, there is no disclosure of such a silylation in BASF/Ziegler et al. Therefore, there can be no teaching or suggestion of the specific embodiments of either of claim 87 or 108.

Therefore, Applicants believe that claims 87 and 108 are patentable over BASF, as evidenced by Ziegler et al., and respectfully request that this rejection be withdrawn.

Double Patenting

The Examiner has provisionally rejected claims 2-4, 6-7, 56-58, 62-63, 67-69, 71, 76-115, and 117-119 under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1 and 6-24 of copending U.S. Patent Application No. 09/308,770.

In paragraph 12 of the Office Action, the Examiner states that, although the conflicting claims are not identical, they are not patentably distinct from each other. The Examiner further states that the methods substantially overlap since the instant claimed methods and the copending methods both employ the open transitional language “comprising” and since the generic terms “lyogel” and “hydrogel” further overlap.

As noted by the Examiner in paragraph 12 of the Office Action, this is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented. Therefore, Applicants believe it would be best to permit the present application to issue into a patent and address this rejection when U.S. Patent Application No. 09/308,770 is further examined, or vice versa. The undersigned notes that this is acceptable under the guidelines set forth in the MPEP.

Conclusion

In view of the foregoing amendments and remarks, Applicants believe that this application is considered to be in good and proper form for allowance, and the Examiner is respectfully requested to pass this application to issue. If, in the opinion of the Examiner, a telephone conference would further expedite the prosecution of the subject application, the Examiner is invited to call the undersigned.

Respectfully submitted,



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